

Editorial

LCA in Japan – the Past, the Present, the Future

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The Past of LCA in Japan

LCA in Japan, i.e. the history of LCA in Japan, the organization of LCA-related activities and LCA priorities in Japan were described in this journal by Hunkeler et al. about two years ago [1]. At that time, the authors stated in their conclusion: "Clearly, if one were to prepare this paper two years from now, its focus would be quite different." Two years have passed since then and there has been substantial progress of LCA in Japan. The recent activities and developments with regard to LCA in Japan are so broad and diverse, that the Editors of this Journal decided to dedicate a whole issue to this topic. However, even this Special Issue would not allow a comprehensive coverage of what recently happened in the field of LCA in Japan. As the Editors of this Special Issue, we tried to select and invite papers that hopefully allow representative insights into the current status and spectrum of LCA activities in Japan – from both a methodology as well as an application perspective. We would like to express our deep gratitude to all the authors that supported this endeavour by submitting their work. To complete and complement the snap shot picture of this Special Issue, we would like to encourage (Japanese) authors to submit their research results to future issues of this Journal.

The Present of LCA in Japan

Japanese progress in LCA has been rapid since the foundation of the Japan LCA Forum in 1991. Key players in the LCA activities come from all relevant sectors like government, research institutions, industry and academia. One of the milestones in Japan since 1998 is the National LCA Project. The Ministry of International Trade and Industry (MITI) started a National LCA Project in the beginning of October 1998. The Japan Environmental Management Association for Industry (JEMAI) is the secretariat of this project. The activities of this project will be continued for 5 years with an overall budget of 850 million Japanese Yen. The objective of this project is to develop a highly reliable database and LCA methodology that can be readily used throughout Japan. The progress of this project was described previously [2-4]. The overall plan and current activities of this project are reviewed in this issue by Yano [5]. Apart from the methodological developments and database construction, the National LCA Project served as promoter and catalyst for

LCA in Japan. The exponential growth of LCA awareness in both industry and academia can be largely attributed to the National Project.

In the field of methodology development, Japanese institutions cover diverse research topics. Impact Assessment, Life Cycle methodologies based on economic input-output-tables and Life Cycle CO₂ methodologies are amongst the most active areas. In this issue, the papers of Hayashi et al. [6] and Itsubo et al. cover new damage function approaches [7], while Moriguchi et al. [8] discuss spatial differentiation in impact assessment. A Life Cycle CO₂ methodology based on economic input-output-tables is introduced by Matsushashi et al. [9].

With regard to case studies, there are examples from industry, consultancy and academia. Yanagitani et al. [10] represent the active electronic industry with a study of alternative refrigerants for air conditioners. The paper of Matsuno et al. [11] deals with Life Cycle Inventories of electricity grid mixes in Japan. Two alternative sludge treatment processes are compared in the case study by Iriyama-Strauss et al. [12]. Finally, there are two papers that relate to the automotive sector. First, Matsushashi et al. [9] compare Life Cycle CO₂ emissions from gasoline and electric vehicles. Second, Kasai [13] explains his views of LCA as a tool for an automotive company.

Apart from methodology development and case studies, there is another area that indicates the progress of and growing interest in LCA and Japan. During the past two years, numerous international and domestic conferences and symposiums related to LCA were held in Japan. Most of the conferences and symposiums attracted a lot of participants. Some of the symposiums seemed so attractive that they were fully booked within a couple of weeks after the announcement of the symposium. As an example, the Third International Conference on Ecobalance was held in Tsukuba, Japan, November 25th to 27th, 1998, attracting 460 participants. This conference was recognized as the largest LCA-related meeting in the world at that time. Hunkeler et al. published a review of this conference in this journal [14]. The contents of other conferences and symposiums after the Third International Conference on Ecobalance are reviewed in this issue by Inaba [15]. The next (Fourth) International Conference on Ecobalance will be held in Tsukuba, Japan, October

31st – November 2nd, 2000. More than 200 papers have been received to date.

Last, but not least, LCA is increasingly relevant in the marketplace. As reviewed in this issue by Inaba [15], there are more and more Japanese companies that have issued environmental reports including their respective LCA activities. This confirms that many Japanese industries have adopted LCA to assess the environmental aspects of their products. Another important area is the development of LCA software tools. National Institutes and private companies in Japan have developed or updated their LCA software recently. Examples are 'NIRE-LCA ver. 3' by the National Institute for Resources and Environment, 'ISO-LCA Navigation Software' by Mechanical Engineering Laboratory, 'Easy LCA' by Toshiba Engineering and 'LCASUPPORT' by NEC Kansai. LCA has been recognized as a business opportunity in Japan. This is indicated by the establishment of NEC's 'LCA Support Center' in 1998, one of the purposes of which is to provide information on LCA through seminars and the nurturing of LCA experts. Some international consulting companies like PE Product Engineering and Ecobilan have opened offices in Japan recently.

The Future of LCA in Japan

After this brief summary of the Past and Present of LCA in Japan, we'd like to conclude with some remarks on future perspectives. We think that the next three years will be very decisive concerning the establishment and stabilisation of LCA in Japan. First, the National LCA Project will be completed in this period of time providing methodologies and a database for practitioners. Second, Japanese industries are currently in the process of evaluating the use of LCA. Within the next three years, Japanese companies will decide whether they are going to use LCA, how they are going to use it and the purposes and applications for which they will use it. Therefore, it will be important to elaborate the relation of LCA to other ISO 14000 tools like Environmental Management Systems, Ecolabelling and Design-for-Environment. Third, Japanese LCA activities play an important role in the development of LCA of the APEC region. Within the next three years, the international cooperation within the APEC region is particularly important because of the geographical location and the economical relations to each other. To discuss this matter, a couple of LCA-related symposiums have been held in Japan and other APEC countries since 1998, e.g. the UNEP/APEC/AIST/NEDO Joint Symposium 'LCA for Asia Pacific Region' at Tsukuba, Japan on November 24th to 25th, 1998 and the APEC/AIST/NEDO Symposium, 'LCA for APEC Member Economies - Collaboration on LCA for basic materials and energy production' to be held at Tsukuba, Japan, on October 31st to November 2nd, 2000 in cooperation with the 4th International Conference on Ecobalance. In addition, Japan proposed a new LCA-related project 'Development of Life Cycle Assessment Network in APEC

Region' in the 18th meeting of APEC Industrial Science and Technology Working Group (IST/WG) that was held at Pattaya, Thailand in March 2000. This project was endorsed with the agreement of 7 member economies.

We can definitely expect more and important activities in the field of LCA in Japan in the next couple of years. However, we think that the three issues mentioned above will play a key role for the future of LCA in Japan. We believe that the activities mentioned will lead to success. We hope and expect that they will pave the way for Japan as one of the leading countries in the international LCA community.

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